engines from meeting the requirements of this part, you must correct the defect as soon as possible for any future production for engines in every family affected by the defect.

(e) You may voluntarily recall an engine family for emission failures, as described in 40 CFR 1068.535, unless we have ordered a recall for that family under 40 CFR 1068.505.

(f) You have the right to a hearing before we order you to recall your engines or implement an alternative remedy (see §1048.820).

§1048.420 What in-use testing information must I report to EPA?

(a) In a report to us within three months after you finish testing an engine family, do all the following:

(1) Identify the engine family, model, serial number, and date of manufacture.

(2) For each engine inspected or considered for testing, identify whether the diagnostic system was functioning.

(3) Describe the specific reasons for disqualifying any engines for not being properly maintained or used.

(4) For each engine selected for testing, include the following information:

(i) Estimate the hours each engine was used before testing.

(ii) Describe all maintenance, adjustments, modifications, and repairs to each test engine.

(5) State the date and time of each test attempt.

(6) Include the results of all emission testing, including incomplete or invalidated tests, if any.

(b) Send electronic reports of in-use testing to the Designated Compliance Officer using an approved information format. If you want to use a different format, send us a written request with justification for a waiver.

(c) We will send copies of your reports to anyone from the public who asks for them. See §1048.815 for information on how we treat information you consider confidential.

(d) We may ask for more information.

[67 FR 68347, Nov. 8, 2002, as amended at 70 FR 40476, July 13, 2005]

§1048.425 What records must I keep?

(a) Organize and maintain your records as described in this section. We may review your records at any time.

(b) Keep paper records of your in-use testing for one full year after you complete all the testing required for an engine family in a model year. You may use any additional storage formats or media if you like.

(c) Keep a copy of the written reports described in §1048.420.

(d) Keep any additional records related to the procurement process.

[67 FR 68347, Nov. 8, 2002, as amended at 70 FR 40476, July 13, 2005]

Subpart F—Test Procedures

§1048.501 How do I run a valid emission test?

(a) Use the equipment and procedures for spark-ignition engines in 40 CFR part 1065 to determine whether engines meet the duty-cycle emission standards in §1048.101(a) and (b). Measure the emissions of all the pollutants we regulate in §1048.101 using the sampling procedures specified in 40 CFR part 1065. Use the applicable duty cycles specified in §§1048.505 and 1048.510.

(b) Section 1048.515 describes the supplemental procedures for evaluating whether engines meet the field-testing emission standards in §1048.101(c).

(c) Use the fuels specified in 40 CFR part 1065, subpart C, to perform valid tests for all the testing we require in this part, except as noted in §1048.515. For service accumulation, use the test fuel or any commercially available fuel that is representative of the fuel that in-use engines will use.

(d) In place of the provisions of 40 CFR 1065.405, you may consider emission levels stable without measurement after 50 hours of engine operation.

(e) To test engines for evaporative emissions, use the equipment and procedures specified for testing diurnal emissions in 40 CFR 86.107–96 and 86.133–96 with fuel meeting the specifications in 40 CFR part 1065, subpart C. Measure emissions from a test engine with a complete fuel system. Reported emission levels must be based on the

highest emissions from three successive 24-hour periods of cycling temperatures. Note that you may omit testing for evaporative emissions during certification if you certify by design, as specified in § 1048.245.

(f) You may use special or alternate procedures to the extent we allow them under 40 CFR 1065.10.

(g) This subpart is addressed to you as a manufacturer, but it applies equally to anyone who does testing for you, and to us when we perform testing to determine if your engines meet emission standards.

(h) Map all engines (including constant-speed engines) using the procedures specified in 40 CFR part 1065 for variable-speed engines. For constant-speed engines, continue the mapping procedure until you reach the high-idle speed (the highest speed at which the engine produces zero torque).

[70 FR 40476, July 13, 2005]

§ 1048.505 How do I test engines using steady-state duty cycles, including ramped-modal testing?

This section describes how to test engines under steady-state conditions. In some cases, we allow you to choose the appropriate steady-state duty cycle for an engine. In these cases, you must use the duty cycle you select in your application for certification for all testing you perform for that engine family. If we test your engines to confirm that they meet emission standards, we will use the duty cycles you select for your own testing. We may also perform other testing as allowed by the Clean Air Act.

(a) You may perform steady-state testing with either discrete-mode or ramped-modal cycles, as follows:

(1) For discrete-mode testing, sample emissions separately for each mode, then calculate an average emission level for the whole cycle using the weighting factors specified for each mode. Calculate cycle statistics for the sequence of modes and compare with the specified values in 40 CFR 1065.514 to confirm that the test is valid. Operate the engine and sampling system as follows:

(i) *Engines with lean NO_X aftertreatment.* For lean-burn engines that depend on aftertreatment to meet the NO_X emission standard, operate the engine for 5–6 minutes, then sample emissions for 1–3 minutes in each mode.

(ii) *Engines without lean NO_X aftertreatment.* For other engines, operate the engine for at least 5 minutes, then sample emissions for at least 1 minute in each mode. Calculate cycle statistics for the sequence of modes and compare with the specified values in 40 CFR part 1065 to confirm that the test is valid.

(2) For ramped-modal testing, start sampling at the beginning of the first mode and continue sampling until the end of the last mode. Calculate emissions and cycle statistics the same as for transient testing.

(b) Measure emissions by testing the engine on a dynamometer with one or more of the following sets of duty cycles to determine whether it meets the steady-state emission standards in § 1048.101(b):

(1) For engines from an engine family that will be used only in variable-speed applications, use one of the following duty cycles:

(i) The following duty cycle applies for discrete-mode testing:

TABLE 1 OF § 1048.505

C2 Mode No.	Engine speed [1]	Observed torque [2]	Minimum time in mode (minutes)	Weighting factors
1	Maximum test speed	25	3.0	0.06
2	Intermediate test speed	100	3.0	0.02
3	Intermediate test speed	75	3.0	0.05
4	Intermediate test speed	50	3.0	0.32
5	Intermediate test speed	25	3.0	0.30